Air Force Research Laboratory|AFRL

Science and Technology for Tomorrow's Air and Space Force

Success Story

LIFE-SAVING VEIN VIEWING TECHNOLOGY DELIVERED TO MEDICAL COMMUNITY

Manufacturing the vein viewer device will provide both the Air Force and the medical community with a solution to the need for a reliable, accurate, and inexpensive point-of-care device for viewing a patient's veins rapidly and accurately, in conditions where the lighting is less than optimal. On the battlefield, in hospitals, and at the scene of accidents, prompt intravenous (IV) administration has the potential of saving countless lives.

During the course of this project, Materials and Manufacturing Directorate scientists and engineers developed contacts and working relationships with researchers in the medical imaging community, the venture capital community, and the inventor/entrepreneurial communities in Ohio. These contacts help the directorate learn of new inventions and solutions, for transfer to the Air Force community, to solve expensive or difficult problems at minimum cost or disruption to traditional business practices.

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Accomplishment

Directorate scientists invented, developed, patented, and licensed a vein viewing device that can see beneath the skin and through body sections to show the vasculature (the network of blood veins in the body) in a broad range of lighting conditions. The device dramatically shortens the time between occurrence of a wound and the IV administration of life-sustaining fluids—a factor that could save the lives of severely wounded soldiers as well as auto accident victims and trauma victims.

Due to the technology's potential for a broad range of civilian medical uses, the directorate established a Cooperative Research and Development Agreement with InfraRed Imaging Systems, Inc. of Columbus, Ohio. They will manufacture and market the technology to the medical industry and expand the technology to solve other critical medical challenges.

Background

The vein viewer device, which uses night vision goggles (NVGs) equipped with special filters developed by the Air Force, sees infrared light as it passes through a patient's body. Directorate scientists used a television remote control infrared light source and standard military NVGs to clearly detect the partial absorption of infrared light by blood in veins.

This device provides users with a clear view of the network of veins in fingers, hands, lower arms, and feet. Research showed that the capability to view veins is due to the absorption of infrared light by deoxygenated hemoglobin traveling in veins, while bone, muscle, and other tissue transmit or scatter the infrared light rather than absorbing it. Additional experiments proved that a needle beneath the skin would also be visible because metal blocks infrared light.

Directorate scientists demonstrated a prototype device at Wright-Patterson Medical Center, Cincinnati Children's Hospital Medical Center, and Columbus Children's Hospital, all in Ohio. Physicians involved in the demonstrations suggested the technology could be used effectively to alleviate a great deal of suffering by patients including infants, the elderly, and patients who must undergo painful medical procedures requiring repeated access to veins such as chemotherapy or dialysis.

Materials and Manufacturing
Technology Transfer

Additional information

To receive more information about this or other activities in the Air Force Research Laboratory, contact TECH CONNECT, AFRL/XPTC, (800) 203-6451 and you will be directed to the appropriate laboratory expert. (03-ML-05)